

REMARKS/ARGUMENTS

Claims 1-19 are pending in the application. The Applicant hereby requests further examination and reconsideration of the application in view of these remarks.

On page 2 of the office action, the Examiner rejected claims 1-5, 7, and 19 under 35 U.S.C. 102(e) as being anticipated by Zang. On page 6, the Examiner rejected claims 8-15 and 17-18 under 35 U.S.C. 103(a) as being unpatentable over Zang in view of Battou. On page 10, the Examiner rejected claims 6 and 16 under 35 U.S.C. 103(a) as being unpatentable over Zang in view of Battou, and in view of Chudak. For the following reasons, the Applicant submits that all of the pending claims are allowable over the cited references.

Claims 1 and 9

Claim 1 is directed to a method for determining a new restoration path corresponding to a new primary path for a new service in a mesh network. A path cost is generated for each of a plurality of candidate restoration paths associated with the new service. The new restoration path for the new service is selected based on the path cost for each candidate restoration path. To generate the path cost for a candidate restoration path, a set *B-Li-set* of links in the one or more existing primary paths that are already protected by link *Li* is determined for each link *Li* of one or more links in the candidate restoration path. For each link *Li*, a set *I-Li-set* of links in the set *B-Li-set* that are also in the new primary path is determined. For each link *Li*, a link cost *Cost_Li* is determined based on the set *B-Li-set* and the set *I-Li-set*. The path cost is calculated based on a sum of the one or more link costs *Cost_Li*.

In rejecting claim 1, the Examiner stated, on page 3, that Zang discloses "determining, for each link *Li* of one or more links in the candidate restoration path, a set *B-Li-set* of links in the one or more existing primary paths ... that are already protected by link *Li*," citing column 7, lines 35-42. Column 7, lines 35-42, of Zang states, in its entirety:

In this embodiment, the determination of the working paths and the backup paths of a set of connections is done by an integer linear program (ILP). This embodiment that uses ILP will be called ILP1. ILP1 determines the routing and wavelength for each working path and backup sub-path, under the sub-path protection and SRG constraints.

This passage does not state anything about determining, for a link in a candidate restoration path, a set of other links protected by that link, let alone determining, for such a link, a set of links in one or more existing primary paths that are already protected by that link, as recited in claim 1. Thus, the Applicant submits that the Examiner mischaracterized the teachings in Zang in this regard.

The Examiner also stated that Zang discloses "determining, for each link *Li*, a set *I-Li-set* of links ... in the set *B-Li-set* that are also in the primary path," citing wavelengths 360, 361, and 362 of Fig. 3 and column 5, lines 12-25. In the example of Fig. 3, Zang's working (i.e., primary) path includes wavelengths 350, 351, 352, and 353 (see, e.g., column 5, lines 42-45), while Zang's backup (i.e., restoration) path includes wavelengths 360, 361, 362, 363, 364, 365, and 366 (see, e.g., column 5, lines 50-55). It is not clear what the Examiner intended by citing wavelengths 360, 361, and 362, but, whatever was intended, the fact remains that wavelengths 360, 361, and 362 are not in the primary path of Fig. 3; they are in the restoration path of Fig. 3.

Furthermore, column 5, lines 12-25, identifies which network elements (NEs) 301-318 in network 300 of Fig. 3 belong to which network areas 320, 330, and 340. This passage does not say anything about determining, for a link, a set of links that (1) are in another set of links that are

protected by that link and (2) are also in a primary path. Thus, here, too, the Applicant submits that the Examiner mischaracterized the teachings in Zang.

The Examiner also stated that Zang discloses "calculating, for each link Li , a link cost $Cost_Li$ based on the set $B-Li-set$ and the set $I-Li-set$," citing column 8, lines 39-67. Column 8, lines 39-67, relates to the calculation of path costs, not link costs.

In Zang, link costs are assigned, not calculated. For example, in column 2, lines 59-62, Zang explicitly states: "In some embodiments, values are assigned to links between the first network elements" (emphasis added). In column 6, lines 14-23, Zang explicitly teaches:

"In step 404, values are assigned to the links between the network elements in the mesh communication network 300. The value is any number, amount, or cost associated with a link between network elements. In some embodiments, the value is a mileage of the link. ...

In other embodiments, the value of all links is a constant such as '1'." (emphasis added) In column 7, line 67, Zang defines the parameter C_{ij} as "the cost associated with link ij ." Nowhere in Zang are there any teachings related to the calculation of values for the link cost parameter C_{ij} . Significantly, in column 8, lines 39-67, which the Examiner cited as teaching the calculation of link costs, the link cost parameter C_{ij} does not even appear.

There is absolutely no teaching or even suggestion in Zang for the calculation of link costs based on anything similar to the sets $B-Li-set$ and $I-Li-set$ recited in claim 1. Thus, here, too, the Applicant submits that the Examiner mischaracterized the teachings in Zang.

In view of the Examiner's aforementioned mischaracterizations of the teachings in Zang, the Applicant submits that the rejection of claim 1 is improper and should be withdrawn and that claim 1 is in fact allowable over Zang. For similar reasons, the Applicant submits that the rejection of claim 9 is improper and should be withdrawn and that claim 9 is also allowable over the combination of Zang and Battou. Since claims 2-8 and 19 depend directly or indirectly from claim 1, and claims 10-18 depend directly or indirectly from claim 9, it is further submitted that those claims are also allowable over Zang and Battou, whether considered alone or in combination.

Claims 2 and 12

According to claim 2, the set $I-Li-set$ is determined from an intersection of the set $B-Li-set$ and a set $P-set$ of links in the new primary path. In rejecting claim 2, the Examiner argued that Zang's wavelengths 360, 361, and 362 of Fig. 3 and column 5, lines 12-25, "clearly disclose and show" the features of claim 2. It is not apparent to the Applicant how these teachings in Zang in any way "clearly disclose and show" the features of claim 2. The Applicant requests clarification from the Examiner as to precisely what teachings in Zang correspond to the sets $B-Li-set$ and $I-Li-set$ of claim 1 and precisely what teachings in Zang correspond to "the intersection of the set $B-Li-set$ and a set $P-set$ of links in the new primary path." Absent such teachings, the Applicant submits that this provides further reasons for the allowability of claim 2 and similarly of claim 12 over Zang.

Claims 3 and 13

According to claim 3, for link Li , the link cost $Cost_Li$ is a function of whether or not the set $B-Li-set$ is empty. In rejecting claim 3, the Examiner cited Zang's parameter $\delta_{pq,ij}^{k,w}$ in column 8, lines 40-67, of Zang. It is not entirely clear, but it appears that the Examiner is arguing that Zang's parameter $\delta_{pq,ij}^{k,w}$ is an example of the link cost $Cost_Li$ of claim 3. According to column 8, lines 49-51, $\delta_{pq,ij}^{k,w}$ is the value of "1" if the backup path for connection k utilized wavelength w on link

pq when link ij fails; the value of "0" otherwise. Thus, in Zang, link ij is a link in a primary path that fails, while link pq might be in a restoration path for that primary path.

In claim 3, link *Li* is a link in the new restoration path, while the set *B-Li-set* is the set of links in the one or more existing primary paths that are already protected by the link *Li*. Thus, in column 8, lines 40-67, link pq is most analogous to link *Li* of claim 3. It is not clear what in Zang the Examiner believes to be an example of the set *B-Li-set* of claim 3. Absent such teachings, the Applicant submits that this provides further reasons for the allowability of claim 3 and similarly of claim 13 (and also claims 4-6 and 14-16, which depend variously from claims 3 and 13, respectively) over Zang.

Claims 4 and 14

According to claim 4, if the set *B-Li-set* is empty, then the link cost *Cost_Li* is based on bandwidth of the new service. If the set *B-Li-set* is not empty, then the link cost *Cost_Li* is a function of whether or not the set *I-Li-set* is empty. Here, too, the Applicant submits that the Examiner mischaracterized the teachings of Zang.

In rejecting claim 4, the Examiner cited column 8, lines 39-67, and column 9, lines 1-19. Since these passages do not teach anything about a set that is an example of the set *B-Li-set* of claim 4, these passages cannot teach the subject matter of claim 4.

The Applicant submits that this provides further reasons for the allowability of claim 4 and similarly of claim 14 (and also claims 5-6 and 15-16, which depend from claims 4 and 14, respectively) over Zang.

Claims 5 and 15

According to claim 5, if the set *I-Li-set* is empty, then the link cost *Cost_Li* is based on a difference between the bandwidth of the new service and bandwidth currently reserved on the link *Li*. If the set *I-Li-set* is not empty, then the link cost *Cost_Li* is based on a difference between (a) a sum of the bandwidth of the new service and maximum service bandwidth protected by link *Li* for all links in the set *I-Li-set* and (b) the bandwidth currently reserved on the link *Li*. Here, too, the Examiner has mischaracterized the teachings in Zang.

In rejecting claim 5, the Examiner cited column 8, lines 39-67. Since this passage does not teach anything about a set that is an example of the set *I-Li-set*, these passages cannot teach the subject matter of claim 5.

The Applicant submits that this provides further reasons for the allowability of claim 5 and similarly of claim 15 over Zang.

Claims 18-19

According to claims 18-19, the new primary path and the new restoration path share a common source node and a common destination node, and, other than the source and destination nodes, the new primary path and the new restoration path are node disjoint.

In rejecting claim 19, the Examiner indicated that Zang's new primary path includes source network element (i.e., node) 110 and channels 114, 124, 144, and 174 of Fig. 1, while Zang's new restoration path includes channels 118, 134, 148, and 184. In fact, Zang's primary path also includes network elements 120, 140, 170, and 180, while Zang's restoration path also includes network elements 110, 130, 140, 190, and 180. Thus, in addition to sharing source network element 110 and destination network element 180, Zang's primary and restoration paths also share intermediate

network element 140. Thus, it is not true that, other than the source and destination nodes, Zang's primary and restoration paths are node disjoint, because they share network element (i.e., node) 140.

In fact, Zang explicitly requires that the primary and restoration paths use the same shared network elements used to enter or exit areas. See, e.g., column 6, lines 64-65 ("another constraint is the backup path uses the same shared network element that the working path used to enter or exit the area."). For example, in Fig. 3, network element 307 is in both the primary path and the restoration path, and the same is true for network element 314. See, e.g., column 6, line 66, to column 7, line 2. Thus, in Fig. 3, other than the source and destination nodes (i.e., NEs 303 and 316), the primary path and the restoration path are not node disjoint, because they share network elements 307 and 314.

In view of these explicit teachings in Zang, the Examiner's conclusion that Zang discloses that, "other than the source and destination nodes, the new primary path and the new restoration path are node disjoint" constitutes a mischaracterization of the teachings in Zang.

In support of his conclusion, the Examiner cited column 6, lines 56-59, as teaching "link-disjoint." Link disjoint is not the same thing as node disjoint. Being link disjoint means that two paths do not share any common links. Being node disjoint means that two paths sharing common source and destination nodes do not share any other nodes in common. Two paths can be link disjoint without being node disjoint. In fact, each pair of primary and restoration paths in Zang is link disjoint, but not node disjoint. Thus, Zang's teaching of link-disjoint paths does not constitute a teaching of node-disjoint paths.

The Applicant submits that this provides additional reasons for the allowability of claims 18 and 19 over Zang.

Telephonic Interview

On 10/06/08, the Examiner participated in a telephonic interview with the Applicant's attorney Steve Mendelsohn. The Applicant thanks the Examiner for the courtesy of that interview. During the interview, the Applicant's attorney discussed some of the differences between the claimed invention and the teachings of Zang. For example, with regard to claim 1, the Applicant's attorney explained that Zang does not even teach the calculation of link costs at all, let alone the calculation of link costs based on the two determined sets *B-Li-set* and *I-Li-set*. In addition, the Applicant's attorney explained that Zang does not teach the node-disjoint feature of claim 19, citing the passage in Zang that explicitly prohibits that node-disjoint feature from being satisfied.

Conclusion

For the reasons set forth above, the Applicant respectfully submits that the rejections of claims 1-19 under Sections 102(e) and 103(a) have been overcome.

In view of the above amendments and remarks, the Applicant believes that the pending claims are in condition for allowance. Therefore, the Applicant believes that the entire application is now in condition for allowance, and early and favorable action is respectfully solicited.

Fees

During the pendency of this application, the Commissioner for Patents is hereby authorized to charge payment of any filing fees for presentation of extra claims under 37 CFR 1.16 and any patent application processing fees under 37 CFR 1.17 or credit any overpayment to Mendelsohn & Associates, P.C. Deposit Account No. 50-0782.

The Commissioner for Patents is hereby authorized to treat any concurrent or future reply, requiring a petition for extension of time under 37 CFR § 1.136 for its timely submission, as incorporating a petition for extension of time for the appropriate length of time if not submitted with the reply.

Respectfully submitted,

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